

Francis Fortin

Post-doc LabEx UnivEarthS

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Diploma & Academic curriculum

- 2019 **PhD in Physics of the Universe**, *CEA Saclay and Université de Paris*, France.
- 2016 **MSc in Astronomy and Astrophysics**, *Observatoire de Paris*, France.
- 2014 **BSc in Fundamental Physics**, *Magistère de Physique Fondamentale d'Orsay*, France.
- 2013 **Prep. class for Engineering School**, *Lycée Henri Bergson*, Angers, France.
- 2011 **Baccalauréat**, *Lycée Sainte Agnès*, Angers, France.

Research projects

- Post-doc** **Bin2Grav: from X-ray binaries to gravitational waves**, *LabEx UnivEarthS, laboratoire APC, Université de Paris*.
2020–now
Multi-disciplinary project on X-ray binaries: using of Gaia EDR3 to determine natal kicks on high-mass X-ray binaries, recreating black hole merger events seen by Virgo using binary evolution simulations, finding the birthplace of binaries with Gaia EDR3, formation of magnetars through binary channels.
- Post-doc** **Progenitors of LISA compact binaries: the impact of Gaia in population synthesis models**, *ATER, Astroparticule et Cosmologie (APC), Université de Paris*, France.
2019–2020
Cataloging known X-ray binaries and correlation with Gaia data, simulation of binary evolution tracks with MESA, prediction of GW signals detectable with LISA.
- PhD Thesis** **Binary systems: formation, evolution and environment**, supervised by Sylvain Chaty at *Commissariat à l'énergie Atomique (CEA)*, Saclay, France.
2016–2019
Analysis of observational data from ESO VLT (ISAAC, X-Shooter, FORS2). Spectroscopic identification of new accreting binaries, characterization of the environment of an obscured system and a microquasar, census of known X-ray binaries.

Internships

- Msc, 5 mo. **Revealing the nature of X-ray binaries**, with S. Chaty, AIM, Saclay.
- Msc, 3 mo. **Variability of cataclysmic binaries**, with A. Schwobe, AIP, Potsdam.
- Bsc, 6 w. **Calibration of a magnetic spectrometer**, with F. Hammache, IPN, Orsay.

Teaching duties

- 2021–2022 **University staff training for the use of the Diderot Little Telescope observatory**, *Université Paris Cité*, (20 h).
- 2019–2020 **Physique expérimentale et Physique expérimentale Avancée (L3)**, *Université de Paris*, TPs, experimental projects using the Diderot Little Telescope facilities (126 h).
- 2017–2019 **Première Année Commune aux Études de Santé (L1)**, *Université Paris Diderot*, Physics tutorials for students of medicine (52 h).
- 2017–2018 **Classe Préparatoire aux Écoles d'Ingénieur (L1)**, *Université Paris Diderot*, Oral exams (19 h) and practical tutorials (9 h) in physics.

Supervision and PhD jury

- 2023 **Evolution of massive binary systems and formation of double degenerate binaries**, Invited member for the PhD jury of Julien Marchioro, APC, Paris.
- 2022 **Broadband spectroscopy and modeling of a Be X-ray binary**, Co-supervisor of Coline Dubos, 4 mo. Msc internship, APC, Paris.
- 2021 **Studies of high-mass X-ray binaries with VLT/X-Shooter**, Co-supervisor of Tristan Bouchet, 4 mo. Msc internship, APC, Paris.

Community work

Web admin, open-source and participative catalogue of X-ray binaries, developemen and maintenance of the website and database [on GitHub](#).

Reviewer for A-rank journals, *Astronomy & Astrophysics*.

Examiner, *Natural Sciences and Engineering Research Council of Canada (NSERC)*.

Oral contributions

- Seminars **Cataloging X-ray binaries to understand binary evolution**, 04/2023, GALHECOS, Observatoire Astronomique de Strasbourg
- The formation of massive X-ray binaries : migration and natal kick**, 02/2023, IRAP, Toulouse
- Observing the history of binary stars**, 01/2023, IAS, Orsay
- Talks (11) 2023 : SF2A Strasbourg, ENGRAVE webinar, X-Wind Webinar. 2022 : COSPAR Athènes, PHAROS Rome, GdR OG Toulouse, ENGRAVE Webinar. 2021 : GdR OG Annecy, ENGRAVE Webinar.

Expertise Observationnelle et Compétences

Collaborations ENGRAVE, operations team VLT/X-Shooter, FORS2

Observatories ESO/VLT : X-Shooter, FORS2, VIRCAM, ISAAC
Gaia : DR2, eDR3, DR3

Methods Data reduction pipelines, catalogues & Virtual Observatory, crowded field photometry, broadband spectroscopy, Bayesian inference, Monte-Carlo Markov Chains

Software Python, Iraf, EsoReflex, Gasgano, Molecfit, Topcat

Languages English (fluent, C2), Japanese (bases, B1), German (bases, A2).

Scientific expertise and outreach

- 2022 **At the origin of binary stars, a couple's story**, CNRS and Université Paris Cité press release, [link](#).
- Latest news from the Cosmos**, radio podcast on Aligre FM, [link](#).
- 2020 **The Book of Stars**, Scientific expertise for the French videogame company Ubisoft, writing of 31 cards detailing various aspects of astrophysical objects..
- 2017 **Palais de la Découverte**, Paris, Outreach for the general public, 45' oral presentations about my PhD thesis subject (64h).
- 2015 **Sudent Association ALCOR**, Orsay, Speaker, astronomical observation supervisor.